

**STEP BY STEP RADICAL CHOLECYSTECTOMY IN EARLY GALLBLADDER
CANCER- AN ANALYSIS****Dr. Abhijit Sarma and Dr. Purujit Choudhury***

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Dr. Purujit ChoudhuryAssociate Professor of
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College.**ABSTRACT**

GBC is an “**Indian disease**” and Indian surgeons have to be prepared to accept the “challenge” of GBC. Gallbladder cancer (GBC) is common in Northern India. And probably highest in the world. The western world has a pessimistic attitude towards GBC resulting in inadequate management of even early GBC. At the other extreme is the Japanese aggressiveness with high mortality but very few actual long-term survivors. The Indian surgeons have adopted a Buddhist “middle path” — aggressive surgical approach for “less advanced” GBC and non-surgical palliative approach for “more advanced” GBC. As we know gallbladder cancer (GBC) is the fifth most common cancer of the gastrointestinal tract and the most common cancer of the biliary tract worldwide. T1, T2 (early GBC) and some T3 are treated with extended cholecystectomy (en-bloc resection of liver and lymph node dissection of the hepatoduodenal ligament) with or without resection of the common bile duct. There is a different of opinion regarding the extent of liver resection for GBC among the surgeons that ranges from non anatomical wedge resection of the gallbladder bed or an anatomical liver resection of segment IVb and V, to an extended hepatectomy for advanced GBC. However, what constitutes an optimal extent of liver resection for the early operable GBC remains a matter of contention and largely depends on the surgeon’s preference with no strong evidence available supporting the superiority of one technique over another. The results in terms of disease outcome and survival are comparable and hence need a meticulous study to achieve standardization. This review summarizes in brief the present literature on the subject. Staging laparoscopy to detect metastatic deposits on liver, peritoneum and omentum, and upper gastrointestinal endoscopy (UGIE) to detect duodenal infiltration which indicates unresectability and majority do not perform pancreaticoduodenectomy for GBC. The favored procedure is extended cholecystectomy (EC) which includes a 2-3 cm non-anatomical wedge of liver in the GB bed and the lymph nodes in hepatoduodenal ligament, behind the duodenum and head of pancreas and along the hepatic artery to the right of celiac axis. EC can achieve R0 resection in patients with T1-T2 and T3 disease.

KEYWORDS: Gallbladder cancer (GBC); non anatomical wedge resection; segmental IVb and V liver resection; survival; recurrence, cholelithiasis, RCT (radio-chemo therapy).

INTRODUCTION**Gallbladder cancer — an “Indian disease”**

Gallbladder cancer (GBC) is the most common biliary tract malignancy worldwide — more common than cholangiocarcinoma, which somehow has received more attention than GBC from surgeons.; GBC constitutes 80-85% of the total biliary tract cancer.^[1] Incidence rates of GBC are low (around 1 per 100 000 per year) in the west (United States, United Kingdom, Australia, and New Zealand). Areas of high incidence rates are in Central and South America, Central and eastern Europe, and Japan. It is a lethal and deadliest disease with a dismal prognosis and mean overall survival and 5 year survival rates reported as low as 6 months and 5% respectively.^[2]

Recently, the Indian Council of Medical Research¹ has reported that incidence rates for GBC in women in Northern India — more than 9 per 100 000 per year — are one of the highest in the world. GBC is the most common malignancy of the gastrointestinal tract in women¹ and the most common cause of malignant surgical obstructive jaundice in Northern India.^[2] Several northern Indian centers had reported many experiences with GBC in the 1970s and 1980s.^[3] The All India Institute of Medical Sciences (AIIMS), New Delhi group has highlighted the dismal prognosis in patients with GBC. The incidence of incidentally detected GBC varies from 0.23%.^[3] GBC incidence is extremely variable by geographical region and racial ethnic groups. The highest

incidence of GBC occurs in Chileans and Bolivians, with Chile recording the highest prevalence (16 27/100,000) and the highest mortality of 5.2% for GBC cases in the world.^[4] The high risk areas in Asia include India (14 21.5/100,000), Pakistan (11/100,000) and Japan (7/100,000).^[5] GBC is a common cancer in northern and northeastern states of India. High prevalence of the disease is seen in Uttar Pradesh, Bihar, Orissa, West Bengal and Assam. GBC ranks amongst the first 10 cancers in the ICMR registries (2006 2008) of Delhi, Dibrugarh, Kolkata, Bhopal and Mumbai and its incidence in North India seems to be rising.^[6] Surgery (R0 resection) is the main stay of treatment of this disease as because GBC is relatively resistant to currently known chemotherapy and radiotherapy regimens (CRT). The prime purpose of this article is to highlight the controversial issues regarding the extent of liver resection in early GBC (namely T1, T2) and some T3 disease (**AJCC recent 8th edition**) with minimal liver infiltration so as to achieve an adequate oncological clearance and pursue oncologic principle.

Surgical Anatomy

The gallbladder is a pear shaped structure with a volume of 30-60 ml that acts as an extra hepatic reservoir for bile. Its different parts include the fundus, body, infundibulum with the Hartmann's pouch (pathological) and neck. The attachment of gallbladder to the inferior surface of liver, known as the gallbladder fossa marks the separation of the left and right lobes of the liver (functional). The gallbladder is located underneath the inferior surface of liver near inferior border, enveloped by the segment IVb and V. The Glisson's capsule is absent in the region of attachment of the gallbladder to the liver and this common surface provides the venous and lymphatic drainage of the gallbladder. The venous

drainage of gallbladder is through multiple veins which enter the liver through the gallbladder fossa (segment IVb and V) and join tributaries of the hepatic veins. The rest of the gallbladder is drained by one or two cystic veins which commonly enter the liver, either directly or after joining the veins draining the hepatic ducts and the upper part of the bile duct.^[6] There are 2-20 cholecystic veins that drain directly in the middle hepatic vein radicals forming the basis of en bloc hepatic resection T1b and above GBC. There is rarely a venous communication to portal vein. In early mucosal lesion (T1a) venous invasion is very rare. The wall of the gallbladder is characteristically different from rest of the gastrointestinal tract as it does not contain submucosa and muscularis mucosa. The wall comprises of mucosa (epithelium and lamina propria), muscularis layer (3 underdeveloped layers), perimuscular connective tissue and serosa on the peritoneal surface. This anatomical fact that serosa is not present towards the hepatic side is reflected in the early hepatic invasion seen in GBC.^[7] Liver invasion in GBC can be of four types:

- 1) Liver bed type: Direct invasion across gallbladder bed.
- 2) Hepatic hilum type: direct invasion along the Glissonian sheath of ducts.
- 3) Metastasis to the gallbladder bed segments of the liver i.e. segment IVB and V.
- 4) Generalised liver metastasis.^[8,9]

The liver bed type and segment IVB and V invasion are amenable to gallbladder bed wedge resection or a formal anatomical resection of segments IV B and V, however the Hilum type of liver invasion usually mandates an extended liver resection with a possible vascular resection and reconstruction.

Table 1: TNM Staging (as per AJCC 8th Edition).^[10,11]

Tis	In situ
T1a	Lamina propria
T1b	Muscular invasion
T2	Perimuscular connective tissue
T2a	Towards serosa but not involved
T2b	Towards liver but not involved. (Here serosa is absent.)
T3	Serosal invasion and/or direct liver invasion and/or single extra hepatic organ
T4	Tumor invade portal vein/hepatic artery and/or 2 or more extra hepatic organ
N1	1-3 regional lymph nodes involved.
N2	4 or more regional lymph nodes involved.
M1	Distal metastases

Stage 1a	Stage 1b	Stage 2a	Stage 2b	Stage 3a	Stage 3b	Stage 4a	Stage 4b
T1a N0M0	T1b N0M0	T2a N0M0	T2b N0M0	T3a N0M0	T1-3N1M0	T4N0- 1M0	Any TN 2M0/ AnyTN0M1

Extent of liver resection

Recent surgical literature has documented an increase of 5 year survival rates from 5-12% up to 38%.^[12] Because the survival of patients treated by palliative chemotherapy or radiation is poor, limited to months, an

aggressive surgical approach to the locally confined disease is justified. The basic principal of determining the extent of resection is to achieve a microscopic negative surgical margin (R0 resection), while preserving the maximal amount of liver parenchyma. The algorithm

of surgical procedures mainly comprises of a cholecystectomy, liver resection, with or without common bile duct resection, regional lymph node dissection in an en bloc fashion and an occasional adjacent organ resection to achieve a R0 resection. There is considerable controversy regarding what exactly constitutes an “aggressive surgical approach”.^[13] With respect to the liver resection in early gallbladder cancer lesions, the surgical options include a non anatomical wedge resection of ≥ 2 cm of adjacent normal liver tissue of the gallbladder bed or an anatomical parenchyma sparing segment IVb + V resection of liver.

Wedge Resection of the Liver

The advantage of a non anatomic wedge resection is that it requires little dissection at the liver hilum which makes the surgical procedure less tedious. However it has certain disadvantage too like increased bleeding and increased risk of injury to the right portal vein and the right hepatic duct owing to its non anatomical nature of resection.^[8] The main modes of hepatic spread from resectable gallbladder cancer involve both direct invasion and portal tract invasion (lesions within the portal tracts of adjacent liver), the latter of which features intrahepatic lymphatic Invasion.^[14,15]

Wakai et al in 2010 documented that the portal tract invasion is seen only in the vicinity (within about 1 cm) of the advancing margin of direct liver invasion.^[14] Shirai et al in 2012 demonstrated that a hepatectomy margin of approximately 2 cm or more in radical cholecystectomy gives a sufficient oncological clearance. There was no local recurrence in hepatectomy margins reported in their study including 145 patients, 52 of whom underwent wedge resection taking approximately 2 cm or more hepatectomy margin during extended cholecystectomy, which supports the validity of a wedge resection. They suggested that while performing a wedge hepatectomy for invasive tumor, the entire cystic plate should be resected because incomplete excision of the cystic plate violates the suberosal plane of the gallbladder and thus may leave behind tumor cells in this plane. Also, complete excision of the cystic plate facilitates removal of the adipose tissue within the triangle of Calot, which usually contains cystic duct node(s).^[16] In order to address the issue of efficacy of gallbladder bed resection vs. segment 4b+5 resection, Horiguchi et al in 2013 compared these two methods using nation wide data from the Japanese Biliary Tract Cancer Registry and a questionnaire survey.^[17] They analyzed the data of 85 patients with pT2N0 GBC with a median follow up of 85 months. Fifty Five patients were treated with gallbladder bed resection while 30 patients were subjected to segment 4b + 5 resection. They found no difference in 5 year survival rate (76.2% for gallbladder bed resection vs. 65.9% for segment 4a + 5, $p = 0.53$) and disease free survival rate (74.4% for gallbladder bed resection vs. 63.3% for segment 4z+5, $p=0.23$). They concluded that there was no difference in incidence of recurrence in two groups

(32.7% for gallbladder bed resection vs. 26.7% for segment 4b+5, $p=0.39$); moreover, the pattern of hepatic recurrences in two groups was also not different statistically.

Araida et al conducted a questionnaire based retrospective study of 4243 cases of GBC operated at 112 institutions belonging to Japanese society of Biliary Surgery.^[18] There were 293 patients with pT2 lesion and 192 patients with pT3 GBC who had undergone a Ro resection and had no hepatoduodenal ligament invasion. Among pT2 patients, there was no statistically significant difference in 5 year cumulative survival whether patients had undergone gallbladder bed resection of segment 4b+5 resection and irrespective of tumor being on hepatic side (72% for segment 4a+5, $p = 0.77$) or on peritoneal side (86% for gallbladder bed resection vs. 78% for segment 4a+5, $p = 0.98$). There was no difference in frequency of liver metastasis in two groups (7.8% for gallbladder bed resection vs. 3.3% for segment 4a+5, $p = 0.90$); there was no predilection for segment 4a+5 liver metastasis in gallbladder bed resection group. Among pT3 lesions, there was no statistically significant difference in 5 year cumulative survival whether patients had undergone gallbladder bed resection or segment 4b+5 resection or right hepatectomy irrespective of hepatic invasion being absent (51% for gallbladder bed resection vs. 38% for segment 4a+5 vs. 46% for right hepatectomy, $p = 0.98$) or present (32% for gallbladder bed resection vs. 29% for segment 4a+5 vs. 30% for right hepatectomy, p value 0.38); again, the rates of liver metastasis in these three groups were not different.

In an unpublished study comprising of thirty consecutive gallbladder cases, including both primary as well as incidental gallbladder cancer patients, resection of a ≥ 2 cm wedge of apparently normal liver tissue was undertaken during extended cholecystectomy. The identification of normal liver tissue was based on assessment with preoperative radiological imaging, to see extent of liver infiltration on CECT. Intra operatively both palpation and intra operative ultrasound was used to obtain a negative margin status. There were 12 patients each of T2 and T3 stage, 5 patients of T1 stage and 1 patient of stage T4, on final pathological examination. In the study, a negative liver margin was obtained on resection of liver. The liver resection margin clearance obtained in the study was 8mm (minimum) to 20 mm (maximum), on pathological assessment.

Anatomical/segmental resection of liver

Yamaguchi et al, have shown that anatomically the distance from the neck of the gallbladder to the right hepatic duct is only 2 mm and the distance to the bifurcation of the right anterior and posterior duct is 6mm.^[12] Based on this finding they suggested that surgical strategy for GBC should rely not only on the depth of invasion but also upon the site of gallbladder

tumor, thus propagating against a non anatomical resection for gallbladder neck cancer lesions.

Sugita et al in 2000 demonstrated that the venous drainage of gallbladder occurs through multiple cystic veins which drain into segment IV B and V of liver.^[6] Yoshimitsu et al in their study supported this by demonstrating cholecystic venous drainage through helical computed tomography by injecting contrast medium in the cholecystic artery.^[19] For the proponents of anatomical segment IVB and V liver resection, this anatomical knowledge forms the basis of theoretical superiority of segment IVB+V or extended liver resections over wedge liver resection as a part of extended cholecystectomy to prevent micro metastasis.

The philosophy of micro metastasis to segment IVb + V could not gain support among surgeons in the light of contrasting available literature and that is when disease recurs in GBC following treatment, it involves both lobes of liver and does not have predilection for segments IVb + V.^[17]

Ogura et al in 1998 measured the distance between the front of the carcinoma invasion and the resection plane in the hepatic parenchyma.^[8] The distance ranged between 12-20 mm after wedge resection, 16-35 mm after resections of segments IVB + V and 28-58 mm after extended hepatic resections. They suggested that wedge resection of the liver bed and resection of segments IVb + V are advisable for carcinoma localized to the gallbladder alone and for liver bed type with minimal hepatic invasion and an extensive tumor growth pattern. Extensive hepatic resection should be done for GBC of the invasive liver bed and hepatic hilar type. Pawlik et al suggested that margin status was associated with survival, not extent of anatomical or nonanatomical hepatectomy.^[19] Many studies addressed this issue and postulated that wedge resection of gallbladder bed is sufficient for addressing the liver invasion as long as R0 resection can be achieved.^[15,16,17]

In a study conducted by Angelica et al in 2009 at MSKCC, a total of 109 patients underwent evaluation and surgical treatment for adenocarcinoma of the gallbladder.^[21] Overall, 36 patients (35%) underwent major hepatectomy, while the remaining were subjected to segment IVB + V liver resection. Of these 36 patients, 21 had vascular inflow involvement mandating major hepatic resection and 15 patients without vascular involvement underwent empirical major hepatectomy. Presence of vascular inflow involvement or performance of a major hepatectomy was not associated with a change in disease specific survival (DSS). Patients who underwent major hepatectomy had median survival of 27 months and predicted 5 years survival of 31% compared with 45 months and 43% for patients who did not undergo major hepatic resection ($p = 0.10$). Postoperative mortality occurred in 5 of 109 patients (5%), and all of these deaths were in patients who had undergone major

hepatectomy and bile duct excision ($p=0.006$). They concluded that tumor biology and stage, rather than extent of resection, predicts outcome after resection for GBC. Major hepatic resections, including major hepatectomy and CBD resection should be done to achieve R0 resection when required and is not mandatory.

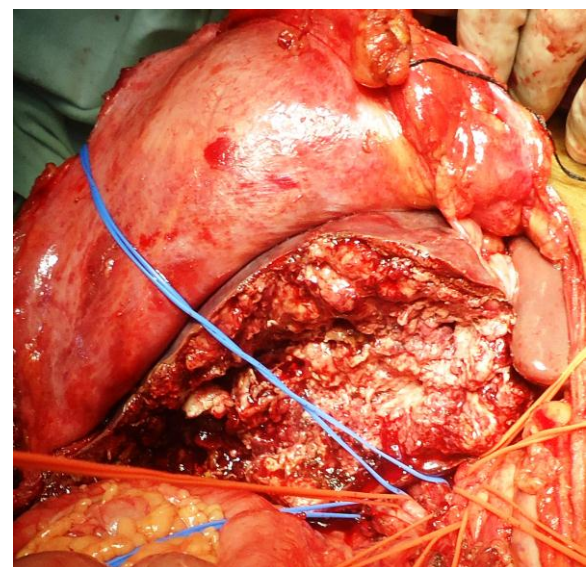
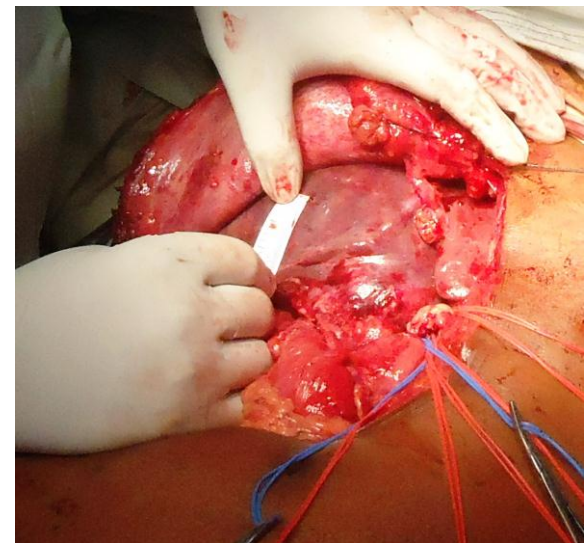
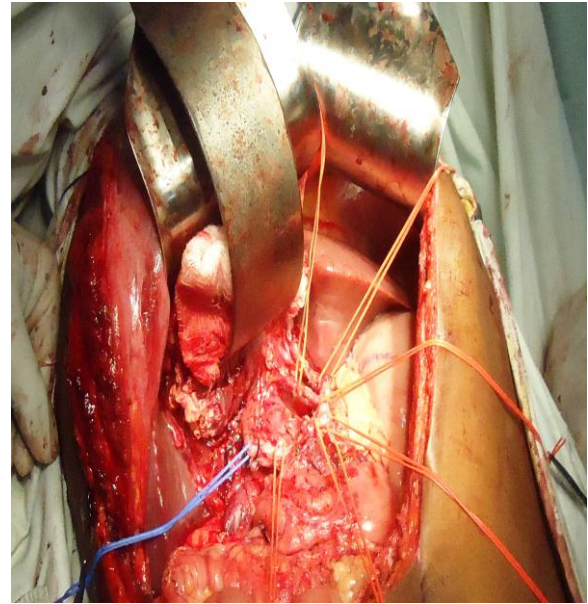
PATIENTS AND METHODS

Total ninety five patients of early GBC were operated at Gauhati Medical College by our team from January, 2015 till January, 2019. All the patients were subjected for radical (extended cholecystectomy). All the patients were considered as early GBC but above Tis and T1a lesion (as per AJCC-8th edition). Because Tis and T1a lesions are only managed by simple cholecystectomy with no adjuvant chemo-radio therapy (as per guideline). Female male ration is 3:1 with 63 female and 32 male .29% of patients(28 patients) are belongs to incidental group. Out of twenty eight patients female were twenty five and four are male. Ten patients had obstructive type of jaundice out of which 7 were female. Two patients are found to be under T1a and no further treatments were adopted except simple cholecystectomy. They were advised for follow up.90% of total patients were from rural area and of poor socio-economic back ground. None of the patients gave +ve family history. All the patients were thoroughly investigated by CT scan and all routine investigations. MRCP advised for only jaundice patients and CA19-9 found to be high in seventy eight patients and rest were within normal limit. MRI in some patients were advised to get T stage. Histopathology of gallbladder confirmed adenocarcinoma and T stage of the disease. Tissue biopsy in pre-operative stage was not advocated. Total seven patients showed cystic duct cut margin positive. One patient had peritoneal metastases detected in the pre- incision laparoscopy and was excluded from radical surgery. One patient had interaortocaval (station (16b1) +ve for malignancy per-operatively by Frozen section and deferred from further radical approach. All other group of lymph nodes were found to be reactive. The patients were subjected for radical cholecystectomy when 10-15 lymph nodes were harvested in different cases. All lymph nodes were assessed by frozen technology. Cystic duct positive patients were subjected for total CBD excision with Roux en Y hepaticojejunostomy. Adjuvant chemotherapy was applied in every patient who were T1b and above lesion. Patients were followed up in every 6 months interval.

Steps of Radical Surgery

1. Patients preparation. Figure.1
2. Incision. Preferably bilateral subcostal and Makuchi. Figure.2
3. Pre-Incision diagnostic laparoscopic.
4. Interaortocaval Dissection and 16b1 send for Frozen.
5. Station13 dissection.

- 6. Hepatoduodenal dissection and all lymphatics and fibrofatty tissue removed. Station 12 send for Frozen. Figure. 3 Cystic duct cut margin send for Frozen in both incidental Figure.6,7 and non incidental gallbladder cancer
- 7. Wedge resection of liver. Figure.4,5
- 8. Mono, bipolar and harmonic used for dissection.





DISCUSSION

Early diagnosis and aggressive surgical resection provide the only chance for a cure for GBC.^[22] However, the extent of parenchymal resection should be dictated by the T-stage of GBC and the ability to obtain a R0 resection. The sole idea of liver resection lies with the principal of achieving a negative surgical margin, while preserving the maximal amount of liver parenchyma.

For patients with Tis and T1a (**Table-1**) tumors, a simple cholecystectomy with negative margins is sufficient. Patients with T1 a disease who undergo simple cholecystectomy alone can be expected to have a disease free survival between 90 and 100%. By contrast, the management of T1b GBC is more controversial.^[23] For T1b lesions, a simple cholecystectomy may be sufficient as long as negative margins are achieved.^[23] Tata group (Mumbai) reported that Tis and T1a are the tumor which do not intended for radical surgery and only cholecystectomy is suffice. They reports that T4 lesions are unresectable. Hari et al also reported an improved 5 year survival of 50% to 79% in patients undergoing extended cholecystectomy for T1b lesions. While these findings may reflect stage migration with more adequate surgical staging, nonetheless, it is important to note that 15% of patients with T1b disease had lymph node metastasis,^[25] and chances for recurrence have been reported as high as 60% in those treated with simple cholecystectomy.^[26] Most of the Japanese surgeons are skeptical to undertake segmental resection over wedge resection as part of radical operation. They have documented through their studies that for T2 and T3 GBC there is no difference in 5 year survival rate, disease free survival rate and incidence of recurrence in two groups. Interestingly, there was an improved outcome in terms of 5 year survival rate and disease free survival rate with gallbladder bed wedge resection although statistically non significant (p>0.05).^[16,17] Tata

group reports that no survival benefit on hepatectomy over wedge resection. They did not find any evidence in favour of segment IVb + V resection over gallbladder bed resection when liver was not directly infiltrated. Araida et al,^[17] found that this finding was irrespective of the tumor being on hepatic side or on peritoneal side. They also observed the patients in the gallbladder bed resection group did not show any predilection for segment IVb + V liver metastasis.

Another important issue to test the validity of any surgical oncological procedure is the margin status. It is one of the most important predictive measures of long term outcome for any resectable cancer. In this regard, the study by Ogura et al,^[8] needs a special mention for they recommended extensive hepatic resection for GBC infiltrating the liver and hepatic hilar type GBC. However, Shirai et al in 2012 demonstrated that with a ≥ 2 cm hepatectomy margin taken during wedge resection a sufficient oncological clearance can be achieved,^[15] Pawlik et al also suggested that margin status was associated with survival, not the extent of anatomical or non-anatomical hepatectomy.^[19] Angelica et al demonstrated that significant independent predictors of survival were overall T and N stage (Table-2) and histologic differentiation that is tumor biology and stage, rather than tumor location or extent of hepatectomy in GBC.^[20]

148 patients studied-

No difference between major hepatectomy VS Wedge resection.

► T M Pawlik et al J Gasterol Surg 2007.

GBC without hepatoduodenal ligament invasion and without loco regional involvement wedge resection of GB (2-3 cm) preferable to hepatectomy.

► A Cavellaro et al. International J. Surg, 2014.

In general- Tis+T1a= 5 year survival after simple cholecystectomy is 99-100%.Lymph node metastases is 0-2.5% but no adjuvant recommended.In T1b+T2=5 year survival after simple cholecystectomy is 40-50% but it become 80% if radical done;In T3 lesion=5 year survival after simple cholecystectomy is 0-15% but it is 25-65% after radical.

Table 2: Incidence of LN Mets in different T stages (Cavallaro A et al, 2012).

T Stage	Lymph nodes involvement (%)
Tis+T1a	0-25
T1b	15-25
T2	30-50
T3	45-75
T4	85

Prevention

Realizing that cure may not be an achievable goal, especially in patients with advanced GBC, several Indian groups are concentrating on the aetiopathogenesis and

primary prevention of GBC. The Varanasi group has evaluated the role of bacteria in bile,⁶⁷ erythrocyte membrane fatty acids,^[22] chronic typhoid carriage,^[23-25] heavy metals,^[26,27] pesticides,^[28] diet,^[29,30] micronutrients,^[31] hormonal factors,^[32] cytochrome P-450 expression,^[33] and trace elements,^[34] in the causation of GBC. Indian groups have also been studying alterations in bile composition in patients with GBC.^[35-41] The AIIMS group has also investigated the role of the typhoid-carrier state in the causation of GBC.^[42] The King George's Medical University, Lucknow group has evaluated the expression of p53 in GBC,^[43] and the GB Pant Hospital group has looked into the association between anomalous pancreatico-biliary ductal union and GBC.^[44] The SGPGIMS group has investigated the role of the *K-ras* oncogene,^[45] and the apolipoprotein B-100 *Xbal* gene,^[46] in GBC. The SGPGIMS group joined hands with the University of Tsukuba, Japan, to investigate the role of cyclo-oxygenase expression,^[47] and MUC 1 core protein in GBC.^[48] Gallstone disease (GSD), the most important risk factor for GBC, is also common in Northern India.^[49] Secondary prevention by prophylactic cholecystectomy in persons with asymptomatic gallstone disease (GSD), however, is controversial, as there is no evidence to support it.^[50,51] The SGPGIMS group has standardized methods of quantification of bile acids,^[52] and cholesterol,^[53] in bile, using nuclear magnetic resonance (NMR) spectroscopy, and the group is currently studying stones obtained from patients with GBC to see if these stones differ in their chemical composition from those obtained from patients with GSD. It is apparent to see differences in CT density between stones from patients with GBC and those from patients with GSD (SGPGIMS unpublished data 2007). These differences, if any, may be used to select out persons with asymptomatic GSD who may be at a higher risk to develop GBC and may, therefore, be advised to undergo pre-emptive cholecystectomy. Role of prophylactic cholecystectomy in certain benign condition other than gallbladder pathology which may precipitate gallbladder cancer in course of time has also been seriously considered.

CONCLUSIONS

Wedge resection of gall bladder bed with ≥ 2 cm apparently normal liver margin provides an adequate oncological clearance for stage T1b, T2 and some T3 tumors with limited hepatic invasion. In this scenario, the disease free survival, 5 year survival and recurrence rates are comparable to anatomical or segmental resection of liver. Segment IVb and V resection or an extended hepatectomy with or without portal vein resection may be required for extensive hepatic hilar or vascular invasion. The extent of hepatectomy should be tailored to the degree of liver invasion so as to achieve a R0 resection while preserving the maximal liver parenchyma. Biology of tumor dictates prognosis.

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